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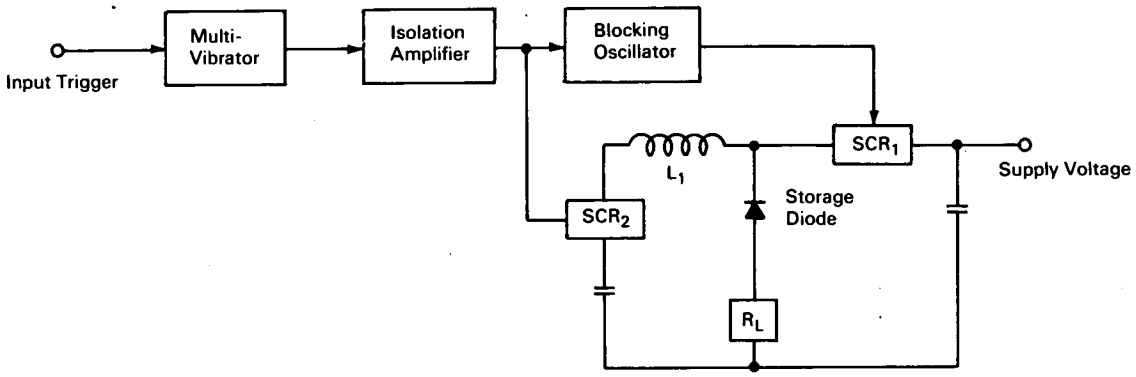
Brief 67-10226

NASA TECH BRIEF

Laboratory Pulse Modulator Uses Minority Carrier Storage Diodes



The problem:

Solid-state modulators producing high peak power have been generally limited to those employing either magnetic compression techniques or pulse forming networks and are usually restricted to operation at a single pulse width and pulse repetition rate.

The solution:

A pulse modulator capable of continuously variable pulse width over a 10 to 1 range of 1.0 microsecond to 0.1 microsecond and operation over a wide range of pulse repetition rates. Pulse width diversity is obtained by operating step-recovery diodes in the reverse conduction mode.

How it's done:

The block diagram illustrates the various stages used in the storage diode modulator. The first stage is a multivibrator turned on by a 3.5 volt, 1 microsecond system input trigger. The multivibrator output pulse, variable in width from 5 to 50 microseconds, is coupled to an emitter-follower type isolation amplifier whose output is directly coupled to SCR_2 that controls the charging current for the storage diode. The amplitude level of the gate trigger is approximately 5 volts, or about twice the minimum amplitude required. A second output from the isolation amplifier is inverted, differentiated, and used to trigger a blocking oscillator whose output is coincident with the multivibrator output trailing edge. Collector-base feed design of the blocking oscillator allows heavy loading without suppression regeneration. The output winding of the blocking oscillator is referenced to the cathode of the main discharge switch SCR_1 which provides the reverse storage diode current (load current). The gate output to SCR_1 is 10 volts to assure rapid turn on.

Note:

Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B67-10226

(continued overleaf)

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: Sylvania Electronic Systems
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